

physical features will find the pocket-book instructive and interesting.

(3) Dr. Stroobant's annual summaries of the most important results obtained in astronomical research each year are models of concise and careful compilation, in which the general reader, as well as the professional astronomer, will find much to interest and instruct.

Limitations of space forbid any extensive *résumé* or discussion of the various sections here, but, whether it be in solar physics or in astronomy of position, it would be difficult to point to any result of value that is not included. In the present volume, as one would naturally expect, Halley's comet is given a prominent place, the bringing together of the most important observations and results occupying about sixty pages; the history of the 1909-10 apparition is brought up to the end of July, 1910, and illustrated by several photographs and charts. W. E. R.

OUR BOOK SHELF.

Inorganic Chemistry for Schools. By W. M. Hootton. Pp. viii+408. (London: Edward Arnold, n.d.) Price 3s. 6d.

THE author of this volume has exercised a considerable amount of ingenuity in illustrating his subject by reference to many of its most interesting technical applications. His own knowledge is evidently extensive and up-to-date, and it is therefore all the more to be regretted that he should have adopted a method of teaching which is radically bad and indefensible. As in so many other cases of the kind, he has evidently sacrificed sound method to the demands of those who require "a sufficient preparation for the London Matriculation (new syllabus), Northern Universities Matriculation, and Army Entrance Examinations in chemistry," compressed into a two years' course, and has adopted a system which approaches perilously near to "cramming" pure and simple.

Formulae are introduced on p. 48, but the pupil has to take them as *ex cathedra* pronouncements until on p. 261, almost at the close of his course, he receives a faulty explanation of the way in which they may be deduced. In the meantime, he must be puzzled by being told, on p. 51, without any explanation, that "phosphorus pentoxide (P_4O_{10}) is a white powder easily soluble in water." It would scarcely be possible to conceive a more direct violation than this of the maxim which forms the opening words of the preface, that "It is demanded of a school course of chemistry that it shall train the reason"! The imperfections of his own reasoning is shown by a statement on p. 267 that "according to Avogadro's theory, the atomic weights of elementary gases are numerically equal to their densities." Such a statement, if reproduced by his pupils, and applied by them to mercury, sulphur, and phosphorus, should go a long way towards securing their failure in the examinations for which this book is intended to prepare them. Such errors would be impossible if the author had consulted the original papers or the "reprints" by which they are now rendered so easily available.

The same lack of accuracy and absence of all historic sense is shown in a very picturesque way on p. 46, Fig. 14, where Lavoisier is represented as heating mercury in a long-necked retort by means of coal-gas and with the help of the burner invented several decades later by Bunsen. In a book so faultily designed and containing such errors, the inclusion of

diagrams of electric furnaces for the manufacture of calcium, of carbide, and of carborundum, is a very inadequate compensation. Such a volume cannot be recommended.

East and West. Comparative Studies of Nature in Eastern and Western States. By S. D. Kirkham. Pp. x+280. (New York and London: G. P. Putnam's Sons, 1911.) Price 7s. 6d. net.

THE title refers to the two horizons of the American continent so widely distant that there is the greatest difference in the scenery and organic life representative of the States situated on the Atlantic and Pacific slopes. Primarily it is the author's desire to interest his countrymen in the natural beauties of the land of their inheritance. He presents a dozen sketches of typical scenes or associations with which he is familiar. The descriptions are taken from localities in the States of New York or Massachusetts, on the east, and from the States of California and Arizona on the west, where the author has evidently spent some time in leisurely observation. Cape Ann, Long Island woods, Chaparral and Arizona gardens are sufficiently explanatory as to their situation; other localities described are the forest-clad waterways in the Adirondacks, the "finger-lakes"—so called on account of their configuration—in New York State, and the Elysian fields, situated in this case in the Santa Inez valley in California.

The sketches or impressions relate almost entirely to natural artistic effects, plant associations, or the habits of birds; they will appeal with special force to the traveller who has trodden paths remote from civilisation. To English readers many of the names of birds and plants will be a puzzle; chickadee, road-runner, phoebe, and vireo are strange; similarly madrona, bay berry, and hobble bush require translation. An appendix of scientific names would add materially to a better understanding of the text. It is evident that the author has found greater diversity and brilliancy in the plant- and bird-life in the western States, for which reason the later sketches are the more attractive and illustrative.

Columbia University Contributions to Anthropology. Edited by Franz Boas. Vol. ii., Kwakiutl Tales. By Franz Boas. Pp. viii+495. (New York: Columbia University Press; Leyden: E. J. Brill, Ltd., 1910.)

THIS volume is the first to appear of a projected annual series under the general editorship of Dr. Franz Boas, and forms, with tales previously published by him, a large mass of material for the study of the myths of the Kwakiutl, who live between River Inlet and Cape Madge, on the coast of British Columbia. There are here many interesting parallels to legends of Japan, Australia, and other distant lands, as well as racial and local tales, often humorous, of culture-heroes and sorcerers, and naïve explanations of the origins of dances and ceremonies, and of animals and natural objects. The usefulness of the collection could have been much increased, especially for readers not familiar with American-Indian lore, by multiplying the footnotes, and by an introduction such as Dr. Boas himself supplied to Teit's "Traditions of the Thompson River Indians," for, as pointed out by him elsewhere, the traditions and organisation of the tribe are mutually explanatory, and here we have the traditions only.

The first tale, for example, has no notes, and yet the general reader can scarcely be expected to know that the victor who takes unawares an adversary more powerful in magic is a tribal culture-hero, and that the double-headed serpents forming the belts and

canoes of the rivals are each the dread *sisiul*, which has a horned snake's head at each end, and a two-horned human head in the middle. It is an unlucky mischance, in a volume otherwise so carefully produced, that four lines which should begin p. 451 are printed at the top of p. 452, and it is only appreciation of the great value for reference of a series for which we are heartily grateful to Dr. Boas and his university that prompts us to beg that no future volume shall, like this, be without an index.

A. R. WRIGHT.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

The Nature of γ Rays.

DR. E. VON SCHWEIDLER pointed out in 1905 that an effect (such as ionisation by α rays) due to a finite number of independent events would be subject to fluctuations. The mathematical theory of the different experiments which have been made to exhibit this with light, α and β rays, has been developed by Mr. N. R. Campbell.

One of us began some preliminary experiments in 1908 at the Cavendish Laboratory to detect discontinuous effects with γ rays. Two forms of apparatus have been used in our experiments. In the first, two similar cylindrical ionisation vessels were placed close together with their axes directed to the source of the γ rays—some radium.

If the γ rays have a spherical wave front, the two similar vessels, being symmetrically placed with respect to the source, should be equally effected by the γ rays, though the resulting ionisation due to the equal effects may not be the same. If, on the other hand, the γ rays are any type of corpuscular radiation (in the Newtonian sense) made of a finite number of particles, the effect in the ionisation vessels would be unequal over short periods of time. To compare the number of ions produced in the two vessels, the electrodes were connected to an electrometer, one vessel being positively, the other negatively, charged. The positive and negative currents from the two cans were balanced as closely as possible for long periods of time, and so there was no large steady drift of the electrometer. The quartz fibre electrometer (Proc. Camp. Phil. Soc., xv., p. 106, 1909) showed fluctuations in the balance.

In the second apparatus a box-shaped ionisation can with a central plane electrode was used. The positive ions formed in one half of the can were received on one side of the flat electrode, the negative ions from the other half of the can on the other side of the electrode. Large fluctuations were observed when the source of γ rays was placed in the plane of the electrode outside the can. This experimental result would be explained if (1) the γ rays from radium are projected particles, or (2) if the number of ions produced in air by a constant source of γ rays is subject to fluctuations.

We are continuing the experiments with the view of determining what part each of these factors plays in producing the fluctuations observed.

T. H. LABY.

P. BURBIDGE.

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(University, N.Z.), Wellington, N.Z.

The Occurrence of a Fresh-water Medusa (*Limnocoidea*) in Indian Streams.

MR. S. P. AGHARKAR, lecturer on biology in the Elphinstone College, Bombay, who has been kind enough to undertake the collection of fresh-water invertebrates on behalf of the Indian Museum, has recently sent me several specimens of a medusa from small streams in the Western Ghats. Although they were taken at so great a distance from the west coast of India, it is important to note that

these specimens were obtained from a river-system which flows across the Indian Peninsula and reaches the sea more than 500 miles away on the shores of the Bay of Bengal. Mr. Agharkar writes as follows:—

"The Medusæ were collected in deep pools of the Koyna and Yenna rivers (tributaries of the Krishna). I was not able to get the hydroid form. I was told that the Medusæ (called flowers or wheels by people) occur regularly in these rivers every dry season. Probably they are present all the year round, only they are swept away by the current during the rainy season and a short time after that. During the dry season, when the stream becomes more or less a succession of deep pools, they become very marked."

In the structure of the manubrium and digestive system, the position of the gonads, the structure of the tentacles, and the form of the umbrella these medusæ agree precisely with *Limnocoidea tanganyicae*. As regards generic identity, there can, indeed, be no doubt, and there is nothing in the specimens before me to suggest even a specific difference. They are not, however, in a particularly good state of preservation, having suffered somewhat in the post, and the question of specific identity may be left unanswered until after an examination of fresh specimens, which I anticipate no difficulty in obtaining at a suitable season. In the meantime, I should be extremely grateful for well-preserved specimens of *Limnocoidea* from Africa in order that an actual comparison may be made.

N. ANNANDALE.

Indian Museum, Calcutta, July 7.

Standard Time in Portuguese Territories.

I BEG to inform you that Standard Time will be in use from January 1, 1912, throughout Portuguese territories, as follows:—

- b. m.
- 8 o E. Macao, Portuguese Timor.
- 5 o E. Portuguese India (provisionally 5h. 30m. E.).
- 2 o E. Portuguese East Africa.
- 1 o E. Portuguese West Africa.
- 0 o (Greenwich, or West Europe).—Portugal, St. Thomé and Príncipe Islands, Whydah.
- 1 o W. Madeira, Portuguese Guinea.
- 2 o W. Açores and Cape Verde Islands.

This observatory remains entrusted with the determination and the telegraphic transmission of Standard Time to the whole country, to the Lisbon time-ball, and to the time station at the Meteorological Observatory, Ponta Delgada (St. Miguel, Açores).

I take this opportunity to state also that the most trustworthy geographical latitude of this observatory is lat. N. $38^{\circ} 42' 30.5''$ (prime vertical, meridian, and zenith telescope series of observations from 1872 to the present, printed or unprinted), and that the designation "*Lisbon, Tapada*," is now the most suitable for it, being similar, for instance, to "*Florence, Arcetri*," or "*Naples, Capodimonte*."

For two years a new astronomical observatory has been in existence and at work at Lourenço Marques; the geographical coordinates are (transit pier):—

Lat. S. $25^{\circ} 58' 4.9'' \pm 0.2''$ (meridian observations by Captain Gago Coutinho).

Long. E. $32^{\circ} 35' 39.4'' \pm 0.05''$ (moon culminations, simultaneously here, and geodetic connection with the Cape).

Altitude (top of pier), 59 metres.

CAMPOS RODRIGUES.

Observatorio Astronomico de Lisboa, Tapada—
Lisboa-Portugal, July 25.

Obsolete Botanical and Zoological Systems.

WOULD some naturalist with a taste for bibliography be so good as to mention books which contain tables of obsolete botanical and zoological systems? Agassiz's "Essay on Classification" and the article on Zoology in the "Encyclopædia Britannica," ninth edition, furnish useful examples, but more are desired.

L. C. M.